WHAT IS CLAIMED IS:

1. A method of measuring a predetermined parameter having a known relation to the transit time of movement of an energy wave through a medium, comprising:

transmitting from a first location in said medium a cyclically-repeating energy wave;

receiving said cyclically-repeating energy wave at a second location in said medium;

detecting a predetermined fiducial point in the cyclically-repeating energy wave received at said second location;

continuously changing the frequency of transmission of the cyclically-repeating energy wave from said first location to said second location in accordance with the detected fiducial point of each received cyclically-repeating energy wave received at said second location such that the number of waves received at said second location from said first location is a whole integer;

and utilizing the change in frequency to produce a measurement of said predetermined parameter.

2. The method according to Claim 1, wherein the frequency of transmission of the cyclically-repeating energy wave from said first location is continuously changed in accordance with said detected fiducial points by utilizing each said detected fiducial point to trigger the transmission of said energy wave.

3. The method according to Claim 1, wherein said predetermined fiducial point is the zero cross-over point of the cyclically-repeating energy wave.

4. The method according to Claim 3, wherein said cyclically-repeating energy wave is a sinusoidal wave.

5. The method according to Claim 1, wherein said changes in the frequency of said cyclically-repeating energy wave are measured by summing the changes in frequency over a predetermined number of cycles to increase the precision of said measurement.

6. The method according to Claim 5, wherein the changes in frequency are summed over said predetermined number of cycles by measuring the changes in wavelengths of the cyclically-repeating energy wave in each cycle, and summing said changes in wavelength over said predetermined number of cycles.

7. The method according to Claim 6, wherein the frequency of said cyclically-repeating energy wave is at least in the KHz range, and said changes in wavelength are summed over at least 100 cycles.

8. The method according to Claim 6, wherein the frequency of said cyclically-repeating energy wave is at least in the hundreds of KHz range, and said changes in wavelength are summed over at least 1000 cycles.

9. The method according to Claim 1, wherein the echo of said cyclically-repeating energy wave, after reflection from an object, is received at said second location.

10. The method according to Claim 1, wherein the cyclically-repeating energy wave is directly received at said second location.

11. The method according to Claim 1, wherein said cyclically-repeating energy wave is an acoustical wave transmitted through said medium.

12. The method according to Claim 11, wherein said predetermined parameter is the distance between said first and second locations.

13. The method according to Claim 11, wherein said predetermined parameter is the temperature of the medium between said first and second locations.

14. The method according to Claim 11, wherein said medium is flowing gas.

15. The method according to Claim 14, wherein said predetermined parameter is the temperature of said flowing gas.

16. The method according to Claim 14, wherein said predetermined parameter is the flow velocity of said flowing gas.

17. The method according to Claim 14, wherein said predetermined parameter is the composition of said flowing gas.

18. The method according to Claim 11, wherein said medium is a gaseous medium, and said predetermined parameter is the pressure of said gaseous medium.

19. The method according to Claim 1, wherein said cyclically-repeating energy wave is an electromagnetic wave.

20. The method according to Claim 19, wherein said predetermined parameter is the distance between said first and second locations.

21. Apparatus for measuring a predetermined parameter having a known relation to the transmit time of movement of an energy wave through a medium, comprising:

a transmitter at a first location in said medium for transmitting a cyclically-repeating energy wave;

a receiver at a second location in said medium for receiving said cyclically-repeating energy wave;

and a processor for:

detecting a predetermined fiducial point in the cyclically-repeating energy wave received at said second location;

continuously changing the frequency of transmission of the cyclically-repeating energy wave from said first location to said second location in accordance with the detected fiducial point of each cyclically-repeating energy wave received at said second location such that the number of waves received at said second location from said transmitter is a whole integer;

and utilizing the change in frequency to produce a measurement of said predetermined parameter.

22. The apparatus according to Claim 21, wherein said processor utilizes each detected fiducial point to trigger the transmitter such that the number of

waves of the cyclically-repeating energy wave transmitted from said first location and received at said second location is a whole integer.

23. The apparatus according to Claim 21, wherein said processor detects the zero cross-over point of each cyclically-repeating energy wave for continuously changing the frequency of transmission of the cyclically-repeating energy wave from said first location to said second location.

24. The apparatus according to Claim 21, wherein said cyclically-repeating energy wave is a sinusoidal wave.

25. The apparatus according to Claim 21, wherein said processor includes a summing circuit for continuously summing the changes in the measured parameter and for producing periodic readouts of the summed changes.

26. The apparatus according to Claim 25, wherein said summing circuit includes a counter which counts the cyclically-repeating energy waves transmitted by the transmitter, and periodically reads out the count after a predetermined number of cycles.

27. The apparatus according to Claim 21, wherein said receiver is located with respect to said transmitter so as to receive the echo of said cyclically-repeating energy wave after reflection from an object.

28. The apparatus according to Claim 21, wherein said receiver is located with respect to said transmitter so as to directly receive said cyclically-repeating energy wave transmitted thereby.

29. The apparatus according to Claim 21, wherein said transmitter transmits a cyclically-repeating acoustical wave.

30. The apparatus according to Claim 29, wherein said predetermined parameter measurement produced by said processor is the distance between said first and second locations.

31. The apparatus according to Claim 29, wherein said predetermined parameter measurement produced by said processor is the temperature of said medium.

32. The method according to Claim 29, wherein said medium is a gaseous medium.

33. The apparatus according to Claim 32, wherein said transmitter and receiver are enclosed within a common envelope, and are spaced from each other by said gaseous medium whose temperature is to be measured.

34. The apparatus according to Claim 32, wherein said transmitter and receiver are located within a passageway through which the gaseous medium flows, and said processor produces a measurement of a parameter of the flowing gaseous medium.

35. The apparatus according to Claim 34, wherein said parameter is the temperature of the flowing gaseous medium.

36. The apparatus according to Claim 34, wherein said parameter is the flow velocity of the flowing gaseous medium.

37. The apparatus according to Claim 34, wherein said parameter is the composition of said flowing gaseous medium.

38. The apparatus according to Claim 21, wherein said transmitter transmits a cyclically-repeating electromagnetic wave through said medium.

39. The apparatus according to Claim 38, wherein said processor produces a measurement of the distance between said first and second locations.

40. The apparatus according to Claim 21, wherein:

said transmitter includes a generator for generating a cyclically-repeating electromagnetic carrier wave, and a modulator for amplitude-modulating said carrier wave by a cyclically-repeating electromagnetic modulating wave, which modulated carrier wave is transmitted by said transmitter and received by said receiver;

said receiver includes a demodulator for separating said modulating wave from the received wave;

and said processor detects the fiducial point of the separated modulating wave and utilizes same for continuously changing the frequency of the modulating wave at the transmitter such that the number of modulating waves in the transmitted and received carrier wave is a whole integer.

41. The apparatus according to Claim 40, wherein the apparatus further includes a delay device for producing a phase shift of a whole-integer multiple in the detected fiducial point before utilized by the processor for changing the frequency of the modulating wave at the transmitter.

42. A method of measuring a predetermined parameter having a known relation to the transit time of movement of an energy wave through a medium, comprising:

transmitting through said medium a cyclically-repeating energy wave;

receiving said cyclically-repeating energy wave transmitted through said medium;

detecting a predetermined fiducial point in the received cyclically-repeating energy wave;

continuously changing the frequency of transmission of the cyclically-repeating energy wave in accordance with the detected fiducial point of each received cyclically-repeating energy wave such that the number of waves received is a whole integer;

and utilizing the change in frequency to produce a measurement of said predetermined parameter.

43. The method according to Claim 42, wherein said transmitted and received cyclically-repeating energy wave is an electromagnetic carrier wave amplitude-modulated by a cyclically-repeating electromagnet modulating wave; said received amplitude-modulated carrier wave being demodulated, and the fiducial point of the demodulated wave being utilized to change the frequency of the modulating wave such that the number of received demodulated waves is a whole integer.

44. The method according to Claim 43, wherein the phase of the received demodulated wave is shifted by a whole-integer multiple before being utilized to change the frequency of the modulating wave.